

**Stantec Analytical Validation Checklist****Report No. ASX88**

Project Name: Amtrak North Yard	Project Number: 213402048
Validator: Linda Goad	Laboratory: Eurofins/Lancaster Laboratory
Date Validated: 9/20/2018	Laboratory Project Number: 1336164
Sample Start-End Date: 9/12/2012 – 9/13/2012	Laboratory Report Date: 10/15/2012
<p>Parameters Validated:</p> <p>Volatile Organic Compounds (VOCs) by EPA SW-846 5035A/8260B – soil matrix</p> <p>Semi-Volatile Organic Compounds (SVOCs) by EPA SW-846 3546/8270C – soil matrix</p> <p>Total Petroleum Hydrocarbons, Gasoline Range Organics (TPH-GRO) by EPA-846 5035A/8015B – soil matrix</p> <p>Polychlorinated Biphenyls (PCBs) by EPA SW-846 3546/8082 – soil matrix</p> <p>Total Petroleum Hydrocarbons, Diesel Range Organics (TPH-DRO) by EPA-846 3546/8015B – soil matrix</p> <p>Metals by EPA SW-846 3050B/6010B/7471A – soil matrix</p> <p>VOCs by EPA SW-846 5030B/8260B – water matrix</p> <p>SVOCs by EPA SW-846 3510C/8270C – water matrix</p> <p>TPH-GRO by EPA-846 5030B/8015B – water matrix</p> <p>PCBs by EPA SW-846 3510C/8082 – water matrix</p> <p>TPH-DRO by EPA-846 3510C/8015B – water matrix</p> <p>Metals by EPA SW-846 3005A/6010B/7470A – water matrix</p> <p>Percent Solids by SM 2540 G</p>	
<p>Samples Validated:</p> <p>SB-51(4.0-4.5), LLI # 6791502</p> <p>SB-51(0.0-2.0), LLI # 6791503</p> <p>SB-51(2.0-4.0), LLI # 6791504</p> <p>SB-52(4.0-4.5), LLI # 6791505</p> <p>SB-52(0.0-2.0), LLI # 6791506</p> <p>SB-52(2.0-4.0), LLI # 6791507</p> <p>SB-52(4.0-4.7), LLI # 6791508</p> <p>SB-53(2.0-2.5), LLI # 6791509</p> <p>SB-53(0.0-2.0), LLI # 6791510</p> <p>SB-54(1.0-1.5), LLI # 6791511</p> <p>SB-54(0.0-1.5), LLI # 6791512</p> <p>SB-55(2.5-2.9), LLI # 6791513</p> <p>SB-55(0.0-2.0), LLI # 6791514</p> <p>Sb-55(2.0-2.9), LLI # 6791515</p> <p>SB-56(2.5-3.0), LLI # 6791516</p> <p>SB-56(2.5-3.0)MS, LLI # 6791517</p> <p>SB-56(2.5-3.0)MSD, LLI # 6791518</p> <p>SB-56(0.5-2.0), LLI # 6791519</p> <p>SB-56(2.0-3.5), LLI # 6791520</p> <p>SB-56(2.0-3.5)MS, LLI # 6791521</p> <p>SB-56(2.0-3.5)MSD, LLI # 6791522</p> <p>DUP-10, LLI # 6791523</p> <p>DUP-11, LLI # 6791524</p>	

EB-09122012, LLI # 6791525  
 SB-57(0.5-1.0), LLI # 6791526  
 SB-57(0.0-2.0), LLI # 6791527  
 SB-57(2.0-4.0), LLI # 6791528  
 SB-58(5.0-5.5), LLI # 6791529  
 SB-58(0.0-2.0), LLI # 6791530  
 SB-58(2.0-4.0), LLI # 6791531  
 SB-58(4.0-5.5), LLI # 6791532  
 SB-59(3.5-4.0), LLI # 6791533  
 SB-59(1.0-2.0), LLI # 6791534  
 SB-59(2.0-4.0), LLI # 6791535  
 SB-60(3.5-4.0), LLI # 6791536  
 SB-60(1.0-2.0), LLI # 6791537  
 SB-60(2.0-4.0), LLI # 6791538  
 EB-09132012, LLI # 6791539

### VALIDATION CRITERIA CHECK

Validation Flags Applicable to this Review:

- U** The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- J** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+** Result is estimated quantity but the result may be biased high.
- J-** Result is estimated quantity but the result may be biased low.
- UJ** The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- NJ** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- B** The analyte was detected in the method, field, and/or trip blank.
- R** The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

1. Were all the analyses requested for the samples submitted with each COC completed by the lab?	Yes	No
	<b>X</b>	

Comments:

2. Did the laboratory identify any non-conformances related to the analytical result?	Yes	No
	<b>X</b>	

Comments:

SVOCs: The laboratory noted that the reporting limits were raised for sample SB-54(0.0-1.5) due to interference from the sample matrix.

TPH-GRO: The laboratory noted that the reporting limits were raised for sample SB-54(0.0-1.5) due to sample foaming.

3. Were sample Chain-of-Custody forms complete?	Yes	No
		<b>X</b>

Comments: Six samples (and MS/MSD) on COC # 307629 did not have the date collected. The laboratory identified the collection date as 9/12/2012. Five samples on COC307630 did not have the date collected. The laboratory identified the collection date as 9/13/2012. Seven samples on COC 307631 did not have the date collected. The laboratory identified the collection date as 9/13/2012.			
4.	Were samples received in good condition and at the appropriate temperature?	Yes <b>X</b>	No
Comments: Based on the laboratory sample receipt form, the samples were received by the laboratory without custody seals.			
5.	Were sample holding times met?	Yes <b>X</b>	No
Comments:			
6.	Were correct concentration units reported?	Yes <b>X</b>	No
Comments:			
7.	Were detections found in laboratory blank samples?	Yes <b>X</b>	No
Comments: Metals: Barium, cadmium, and chromium were detected in the preparation blank at levels below the reporting limits for Method 6010B. None of these metals were detected in the associated samples. Barium, calcium, and thallium were detected in the preparation blanks at levels below the reporting limits for Method 6010B. These metals were either not detected in the associated samples or they were detected at concentrations much greater than the concentrations in the blanks. Associated samples were not qualified.			
8.	Were detections found in field blank, equipment rinse blank, and/or trip blank samples?	NA	Yes <b>X</b>
Comments: Two equipment rinse blank samples, EB-09122012 and EB-09132012, were submitted with the sample delivery group. There were no target analytes detected in the rinse blank samples.			
9.	Were instrument calibrations within method criteria?	NA <b>X</b>	Yes No
Comments: Not Applicable, Level II data validation.			
10.	Were surrogate recoveries within control limits?	Yes	No <b>X</b>

Comments: PCBs: Recovery of the surrogate decachlorobiphenyl (DCB) exceeded the SOPCAP control limits, and was >200%, in samples SB-60(1.0-2.0) (258%) and SB-60(2.0-4.0) (223%). Additionally, the surrogate tetrachloro-m-xylene (TCX) exceeded the SOPCAP control limits, and was <200%, in sample SB-60(1.0-2.0). Detected results for PCBs in these samples were not qualified because the samples were diluted 100X prior to analysis. The surrogate recovery does not provide meaningful information. TPH-DRO: Recovery of the surrogate orthoterphenyl was greater than the laboratory's control limits in samples SB-56(2.0-3.5) (263%), SB-56(2.0-3.5)MS (296%), and SB-56(2.0-3.5)DUP (318%). Since the NFG does not include criteria for TPH-DRO, no data were qualified.			
11. Were laboratory control sample(s) (LCS/LCSD) sample recoveries within control limits?	Yes <b>X</b>	No	
Comments:			
12. Were matrix spike (MS/MSD) recoveries within control limits?	NA	Yes	No <b>X</b>
Comments: The sample SB-56(2.5-3.0) was analyzed as the site-specific MS/MSD for VOCs. The sample SB-51(4.0-4.5) was analyzed as the site-specific MS/MSD for SVOCs. The sample SB-60(2.0-4.0) was analyzed as the site-specific MS/MSD for TPH-GRO. The sample SB-56(2.0-3.5) was analyzed as the site-specific MS/MSD for PCBs, TPH-DRO, and metals. VOCs: All %Rs were within control limits for analytes listed in the NFG and SOPCAP. The %Rs for 1,1,2-trichloroethane (140%/141%) were greater than the laboratory's in-house control limits. Since the NFG does not include criteria for these compounds, no data were qualified. SVOCs: All %Rs were within control limits for analytes listed in the NFG and SOPCAP, with the exception of 2,4-dinitrotoluene, which were 93% and 92% for the MS and MSD, respectively. This compound was not detected in the parent sample and was therefore not qualified per NFG criteria. PCBs: The %Rs for PCB-1016 were less than the control limits of 29-135% published in the NFG (0%/0%). The %Rs for PCB-1260 were outside the control limits of 29-135% in the MS (-808%) and MSD (-659%). Because the sample was diluted 200X, the MS/MSD %Rs are considered diluted out and therefore no data are qualified. TPH-DRO: The %R for TPH-DRO was greater than the laboratory's in-house limits of 35-129% in the MS (1169%). Since the NFG does not include criteria for TPH-DRO, no data were qualified. Metals: The %Rs for antimony were less than the control limits of 75-125% published in the NFG in the MS (67%) and MSD (69%). The %Rs were outside the control limits for calcium in the MS (46%) and MSD (159%). The post digestion spikes were within control limits. Antimony was not detected in the parent sample and therefore not qualified. Calcium was detected in the parent sample and qualified J (estimated) in the parent sample. Note that aluminum, iron, and magnesium had %Rs in the MS and MSD that were outside control limits and the parent concentration was more than 4X the spike concentration; therefore, these analytes were not qualified. Reason code: MS			
13. Were RPDs within control limits?	Yes	No <b>X</b>	
Comments: Metals: The RPD for the recovery of calcium (31%) in the MS/MSD was outside the laboratory's in-house control limit of 20%. Since the NFG does not include MS/MSD RPD criteria for metals, no data were qualified. The laboratory also analyzed a sample/lab duplicate. The RPDs for aluminum (31%), barium (36%), calcium (23%), chromium (53%), cobalt (41%), copper (25%), iron (35%), lead (25%), magnesium (59%), manganese (38%), nickel (42%), potassium (38%), vanadium (38%), and zinc (43%) were greater than the NFG criteria of 20%. These metals were qualified J (estimated) in the parent sample. Reason code: LDUP			

14. Were dilutions required on any samples?		Yes <b>X</b>	No						
Comments: VOCs: Soil samples were field preserved in methanol, resulting in dilution factors ranging from 39.87X to 66.67X. SVOCs: Four soil samples required dilution prior to analysis, with dilution factors of 10X each. TPH-GRO: Soil samples were field preserved in methanol, resulting in dilution factors ranging from 24.18X to 503.02X. PCBs: Seventeen soil samples required dilution prior to analysis, with dilution factors ranging from 5X to 200X. TPH-DRO: Two soil samples required dilution prior to analysis with dilution factors of 5X and 25X. Sample reporting limits were adjusted accordingly. No data were qualified.									
15. Were Tentatively Identified Compounds (TIC) present?	NA <b>X</b>	Yes	No						
Comments: TIC not requested.									
16. Were organic system performance criteria met?	NA <b>X</b>	Yes	No						
Comments: Not Applicable, Level II data validation.									
17. Were GC/MS internal standards within method criteria?	NA <b>X</b>	Yes	No						
Comments: Not Applicable, Level II data validation.									
18. Were inorganic system performance criteria met?	NA <b>X</b>	Yes	No						
Comments:									
19. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.		Yes <b>X</b>	No						
<table border="0"> <tr> <td><b><u>Primary Sample ID</u></b></td> <td><b><u>Duplicate Sample ID</u></b></td> </tr> <tr> <td>SB-56(2.5-3.0) for VOCs</td> <td>DUP-10</td> </tr> <tr> <td>SB-56(2.0-3.5) for PCBs</td> <td>DUP-11</td> </tr> </table>				<b><u>Primary Sample ID</u></b>	<b><u>Duplicate Sample ID</u></b>	SB-56(2.5-3.0) for VOCs	DUP-10	SB-56(2.0-3.5) for PCBs	DUP-11
<b><u>Primary Sample ID</u></b>	<b><u>Duplicate Sample ID</u></b>								
SB-56(2.5-3.0) for VOCs	DUP-10								
SB-56(2.0-3.5) for PCBs	DUP-11								
Comments: VOCs: No VOCs were detected in either the primary or the field duplicate samples. PCBs: PCB-1260 was detected in both samples. The RPD calculated (25%) was within project acceptance criteria. No data were qualified based on the field duplicate results for this pair.									
20. Were at least 10 percent of the hard copy results compared to the Electronic Data Deliverable Results?		Yes <b>X</b>	No Initials KEF						
Comments:									
21. Other?		Yes	No <b>X</b>						

Comments:			
<b>PRECISION, ACCURACY, METHOD COMPLIANCE AND COMPLETENESS ASSESSMENT</b>			
Precision:	Acceptable X	Unacceptable	Initials LEG
Comments:			
Sensitivity:	Acceptable X	Unacceptable	Initials LEG
Comments:			
Accuracy:	Acceptable X	Unacceptable	Initials LEG
Comments:			
Representativeness:	Acceptable X	Unacceptable	Initials LEG
Comments:			
Method Compliance:	Acceptable X	Unacceptable	Initials LEG
Comments:			
Completeness:	Acceptable X	Unacceptable	Initials LEG
Comments:			